

Assessment Rationale — Balanced and Unbalanced Forces (Physical sciences)

Teacher-facing assessment rationale for the Physical sciences summative 'Balanced and Unbalanced Forces'. Maps each situation and rubric criterion to the SCSA Year 4 Physical sciences content description (forces through direct contact and at a distance) and the achievement standard, addresses the common gravity misconception, and justifies validity and fairness. For teacher/moderation use.

This document shows how the summative task **Balanced and Unbalanced Forces** assesses the mandated WA Curriculum (SCSA) Year 4 Science content, and explains the design of the task and marking key. It is for teacher planning and moderation and is not given to students.

Curriculum content assessed

Strand / sub-strand	Content description (SCSA Year 4)
Science understanding — Physical sciences	"Forces are exerted by one object on another through direct contact, such as friction, or from a distance, such as magnetism and gravity."
Science inquiry — Processing, modelling and analysing	"Organise and represent data using tables, column graphs and models to identify patterns" (here, representing forces with arrow models).
Science inquiry — Communicating	"Communicate ideas using scientific vocabulary."

Alignment with the Year 4 achievement standard

The Year 4 achievement standard states that students "observe and investigate forces that operate from a distance, such as magnetism, and by direct contact, such as friction." This task assesses exactly that distinction, and adds the balanced/unbalanced idea used to explain movement.

Situation	What it asks	Content / standard link
1 — Book on a table	Draw the two arrows; decide balanced/unbalanced.	Representing forces; balanced forces (no motion).
2 — Ball on grass	Name friction; classify it; explain it is unbalanced while slowing.	"Direct contact, such as friction."
3 — Two magnets	Name magnetism; classify as a force at a distance.	"From a distance, such as magnetism."
4 — Tug-of-war	Draw unbalanced arrows; explain the resulting motion.	Unbalanced forces change motion; representing forces.
5 — Sorting task	Classify five forces as contact or at a distance.	The core Physical sciences content description.

How the marking key reflects the standard

The two highest-weighted criteria — *Representing forces with arrows* (30) and *Balanced and unbalanced forces* (30) — target the modelling of forces and the balanced/unbalanced reasoning that runs through the task. *Contact and non-contact forces* (25) directly assesses the mandated contact-vs-at-a-distance distinction. *Communication and scientific vocabulary* (15) assesses the communicating content. The High / Sound / Limited descriptors mirror the SCSA judging-standard language.

Addressing a key misconception

A very common Year 4 misconception is that **gravity only "pulls things down"**. Scientifically, gravity is a force that pulls objects with mass *together*; things fall towards Earth because Earth is so massive. Situation 1 and the worksheet in Lesson 15 surface this directly, and teachers should look for (and gently correct) "down" language in student explanations while still crediting correct arrow direction.

Why this task is valid and fair

- **It builds on the taught sequence.** Students meet pushes/pulls, contact vs at-a-distance, and balanced/unbalanced with arrows (Lesson 13), investigate friction (Lesson 14) and explore magnetism and gravity (Lesson 15) before this task — so it assesses developed learning.
- **It uses multiple, everyday situations.** Analysing several familiar contexts (a book, a ball, magnets, a tug-of-war) gives a fuller, fairer picture of understanding than a single item, and the drawing component lets students show understanding visually.

- **It is inclusive.** Arrow diagrams reduce the writing load; sentence starters, a word wall and scribing can be offered as adjustments without changing the science being assessed.

Cross-curriculum and capabilities. Representing forces with labelled, scaled arrows develops **Numeracy** (proportion and representation) and **Critical and Creative Thinking** (reasoning from a model to a prediction about motion).

Moderation note. Credit correct *reasoning* even where a drawing is untidy: the key evidence is whether the student links arrow size and direction to balanced/unbalanced and to the correct force type.